IN THE CLAIMS

Set forth below in ascending order, with status identifiers, is a complete listing of all claims currently under examination. This listing also reflects any cancellation and/or addition of claims.

Claims 1 - 20 (cancelled)

21. (new) An apparatus for removing undesirable components from contaminated water, the contaminated water including both desirable and the undesirable components, the apparatus comprising:

an input line for receiving the contaminated water;

a purifying material adapted to attract both the desirable and undesirable components;

a purifying portion connected to the input line, wherein the purifying portion is configured to transport the purifying material to a separator while the purifying material combines with the undesirable components from the contaminated water so as to generate treated water, the treated water including the desirable components; and

a flow controller adapted to control a transport rate of the purifying material so that the purifying material is separated from the treated water by the separator before the purifying material removes a substantial amount the desirable components from the treated water.

22. (new) The apparatus of claim 21 including a regenerator coupled to the separator, wherein the regenerator is configured to regenerate the purifying material by removing the undesirable components from the purifying material and thereby allowing the purifying material to attract additional undesirable components.

23. (new) The apparatus of claim 22 wherein the regenerator is configured to regenerate the purifying material by counter current contact with a regenerant.

24. (new) The apparatus of claim 22 wherein the purifying portion includes a reaction vessel coupled to the regenerator, wherein the reaction vessel is coupled to the regenerator so as to receive the regenerated purifying material.

25. (new) The apparatus of claim 24 wherein the reaction vessel is a fluidized bed reactor.

26. (new) The apparatus of claim 25 wherein the purifying portion includes an elutriation line coupled between the fluidized bed reactor and the separator.

27. (new) The apparatus of claim 26 wherein the fluidized bed reactor includes a fluid distributor coupled to the input line, and wherein a distance between the fluid distributor and a bottom of the media elutriation line is adjustable so as to vary an amount of time the purifying material is within the purifying portion.

28. (new) The apparatus of claim 21 wherein the purifying portion includes a transport line coupled between the input line and the separator, wherein the transport line is configured to transport the purifying material to the separator while the purifying material combines with the undesirable components from the contaminated water.

29. (new) The apparatus of claim 21 wherein a portion of the undesirable components do not combine with the purifying material and wherein the treated water includes the portion of the undesirable components and the desirable components.

30. (new) The apparatus of claim 21 wherein the purifying material includes ion exchange media.

31. (new) The apparatus of claim 30 wherein the undesirable components include monovalent cations and the desirable components include multivalent cations.

32. (new) The apparatus of claim 22 wherein the flow controller is adapted to enable continuous transport of the purifying material through the purifying portion, the separator and the regenerator.

33. (new) The apparatus of claim 21 wherein the flow controller includes a rotary valve.

34. (new) The apparatus of claim 21 wherein the separator is a gravity settler.

35. (new) The apparatus of claim 21 wherein the separator is a sieve.

36. (new) The apparatus of claim 21 wherein the separator is a hydrocyclone.

37. (new) A method for purifying contaminated water comprising:

receiving the contaminated water;

removing undesirable components from the contaminated water with a purifying material to generate treated water, wherein the treated water includes desirable components, and wherein the purifying material attracts both the undesirable and desirable components; and

separating the purifying material from the treated water before substantial amounts of the desirable components are removed from the treated water.

38. (new) The method of claim 37 including:

removing additional undesirable components from the purifying material before removing the undesirable components from the contaminated water.

39. (new) The method of claim 37 wherein removing undesirable components from the contaminated water is carried out while transporting the contaminated water and the purifying material to a separator.

40. (new) The method of claim 39 wherein transporting the contaminated water includes substantially continuous movement of the contaminated water and the purifying material to the separator.

41. (new) The method of claim 37 wherein removing the undesirable components from the contaminated water includes removing a portion of the undesirable components from the decontaminated water thereby leaving some undesirable components in the treated water.

42. (new) The method of claim 41 wherein the rate of the transporting the contaminated water is controlled by a continuously moving rotary valve.

43. (new) The method of claim 37 wherein removing undesirable components from the contaminated water is carried out in a reaction volume, the reaction volume including a volume of a fluidized bed reactor.

44. (new) The method of claim 43 further comprising reducing a contact time between the purifying material and the desirable components by adjusting the reaction volume.

45. (new) The method of claim 37 wherein the purifying material includes ion exchange media.

46. (new) The method of claim 45 wherein the undesirable components include monovalent cations and the desirable components include multivalent cations.

47. (new) The method of claim 46 wherein the separating is carried out by a sieve.

48. (new) The method of claim 46 wherein the separating is carried out by a gravity settler.

49. (new) The method of claim 46 wherein the separating is carried out by a hydrocyclone.

50. (new) An apparatus for purifying contaminated water comprising:

means for receiving the contaminated water;

means for removing undesirable components from the contaminated water with a purifying material to generate treated water, wherein the treated water includes desirable components, and wherein the purifying material attracts both the undesirable and desirable components; and

means for separating the purifying material from the treated water before substantial amounts of the desirable components are removed from the treated water.

51. (new) The apparatus of claim 50 including:

means for removing additional undesirable components from the purifying material before removing the undesirable components from the contaminated water.

52. (new) The apparatus of claim 50 wherein the means for removing undesirable components from the contaminated water includes means for removing undesirable components from the contaminated water while transporting both the contaminated water and the purifying material to a separator.

53. (new) The apparatus of claim 52 wherein the means for transporting includes means for continuously moving the contaminated water and the purifying material to the separator.

54. (new) The apparatus of claim 53 where the means for transporting includes a rotary valve adapted to rotate continuously.

55. (new) The apparatus of claim 50 wherein the means for removing includes a fluidized bed reactor.

56. (new) The apparatus of claim 55 wherein the fluidized bed reactor includes means for adjusting a reaction volume of the fluidized bed reactor so as to vary a contact time between the purifying material and the desirable components.

57. (new) The apparatus of claim 50 wherein the purifying material includes ion exchange media.

58. (new) The apparatus of claim 57 wherein the undesirable components include monovalent cations and the desirable components include multivalent cations.

59. (new) The apparatus of claim 58 wherein the means for separating includes a gravity settler.

60. (new) The apparatus of claim 58 wherein the means for separating includes a sieve.

61. (new) The apparatus of claim 58 wherein the means for separating includes a hydrocyclone.

62. (new) An apparatus for removing undesirable components from contaminated water comprising:

an input line for receiving the contaminated water;

a purifying material adapted to combine with the undesirable components so as to generate treated water;

a separator configured to separate the purifying material from the treated water;

a purifying portion coupled between the input line and the separator, wherein the purifying material combines with the undesirable components within the purifying portion; and

a flow controller coupled to the purifying portion, wherein the flow controller is adapted to vary the amount of purifying material exposed to the contaminated water so as to be capable of varying the amount of undesirable materials removed from the contaminated water.

63. (new) The apparatus of claim 62 including a regenerator coupled to the separator, wherein the regenerator is configured to regenerate the purifying material by removing at least a portion of the undesirable components from the purifying material, thereby allowing the purifying material to attract additional undesirable components.

64. (new) The apparatus of claim 63 wherein the regenerator is configured to regenerate the purifying material by counter current contact with a regenerant.

65. (new) The apparatus of claim 63 wherein the purifying portion includes a reaction vessel coupled to the regenerator, wherein the reaction vessel is coupled to the regenerator so as to receive the regenerated purifying material.

66. (new) The apparatus of claim 65 wherein the reaction vessel is a fluidized bed reactor.

67. (new) The apparatus of claim 66 wherein the purifying portion includes an elutriation line coupled between the fluidized bed reactor and the separator.

68. (new) The apparatus of claim 67 wherein the fluidized bed reactor includes a fluid distributor coupled to the input line, and wherein a distance between the fluid distributor and a bottom of the media elutriation line is adjustable so as to vary an amount of time the purifying material is within the purifying portion.

69. (new) The apparatus of claim 62 wherein the purifying portion includes a transport line coupled between the input line and the separator, wherein the transport line is configured to transport the purifying material to the separator while the purifying material combines with the undesirable components from the contaminated water.

70. (new) The apparatus of claim 62 wherein a portion of the undesirable components do not combine with the purifying material and wherein the treated water includes the portion of the undesirable components and the desirable components.

71. (new) The apparatus of claim 62 wherein the purifying material includes ion exchange media.

72. (new) The apparatus of claim 71 wherein the undesirable components include monovalent cations and the desirable components include multivalent cations.

73. (new) The apparatus of claim 63 wherein the flow controller is adapted to ensure continuous transport of the purifying material through the purifying portion, the separator and the regenerator.

74. (new) The apparatus of claim 62 wherein the flow controller includes a rotary valve.

75. (new) The apparatus of claim 62 wherein the separator is a gravity settler.

76. (new) The apparatus of claim 62 wherein the separator is a sieve.

77. (new) The apparatus of claim 62 wherein the separator is a hydrocyclone.

78. (new) A method for purifying contaminated water comprising:

receiving the contaminated water;

mixing the contaminated water with a purifying material, wherein the purifying material is adapted to combine with undesirable components from the contaminated water so as to generate treated water;

continuously varying an amount of purifying material mixed with the contaminated water so as to continuously vary the amount of undesirable components removed from the contaminated water; and

separating the purifying material from the treated water.

79. (new). The method of claim 78 including:

removing additional undesirable components from the purifying material before mixing the contaminated water with the purifying material.

80. (new) The method of claim 78 including transporting both the purifying material and the contaminated water to a separator while the purifying material combines with the undesirable components.

81. (new) The method of claim 80 wherein transporting both the purifying material and the contaminated water includes substantially continuous movement of the purifying material and the contaminated water to the separator.

82. (new) The method of claim 78 wherein the separating occurs before a substantial amount of desirable components are removed from the treated water.

83. (new) The method of claim 78 wherein varying the amount of purifying material includes varying the amount of purifying material so as to remove substantially all the undesirable components from the contaminated water.

84. (new) The method of claim 78 wherein mixing the contaminated water includes mixing the contaminated water with the purifying material in a reaction volume, the reaction volume including a volume of a fluidized bed reactor.

85. (new) The method of claim 84 including adjusting the reaction volume so as to reduce a contact time between the purifying material and the contaminated water.

86. (new) The method of claim 78 wherein the purifying material includes ion exchange media.

87. (new) The method of claim 78 wherein the undesirable components include monovalent cations.

88. (new) The method of claim 78 wherein the separating is carried out by a sieve.

89. (new) The method of claim 78 wherein the separating is carried out by a gravity settler.

90. (new) The method of claim 78 wherein the separating is carried out by a hydrocyclone.

91. (new) An apparatus for purifying contaminated water comprising:

means for receiving the contaminated water;

means for mixing the contaminated water with a purifying material, wherein the purifying material is adapted to combine with undesirable components from the contaminated water so as to generate treated water;

means for continuously varying an amount of purifying material mixed with the contaminated water so as to be capable of continuously vary the amount of undesirable components removed from the contaminated water; and

means for separating the purifying material from the treated water.

92. (new) The apparatus of claim 91 including:

means for removing additional undesirable components from the purifying material before mixing the contaminated water with the purifying material.

93. (new) The apparatus of claim 91 including means for transporting both the purifying material and the contaminated water to the means for separating while the purifying material combines with the undesirable components.

94. (new) The apparatus of claim 93 wherein the means for transporting both the purifying material and the contaminated water includes means for continually moving the purifying material and the contaminated water to the separator.

95. (new) The apparatus of claim 91 wherein the means for separating includes means for separating the purifying material from the treated water before a substantial amount of desirable components are removed from the treated water.

96. (new) The apparatus of claim 91 wherein the means for varying the amount of purifying material includes means for varying the amount of purifying material so as to remove substantially all the undesirable components from the contaminated water.

97. (new) The apparatus of claim 91 wherein the means for mixing the contaminated water includes a reaction volume, the reaction volume including a volume of a fluidized bed reactor.

98. (new) The apparatus of claim 97 including means for adjusting the reaction volume so as to reduce a contact time between the purifying material and the contaminated water.

99. (new) The apparatus of claim 91 wherein the purifying material includes ion exchange media.

100. (new) The apparatus of claim 91 wherein the undesirable components include monovalent cations.

101. (new) The apparatus of claim 91 wherein the means for separating includes a sieve.

102. (new) The apparatus of claim 91 wherein the means for separating includes a gravity settler.

103. (new) The apparatus of claim 91 wherein the separating is carried out by a hydrocyclone.

CONCLUSION

The Commissioner is hereby authorized to charge any appropriate fees under 37 C.F.R. §§1.16, 1.17, and 1.21 that may be required by this paper, and to credit any overpayment, to Deposit Account No. 50-1283.

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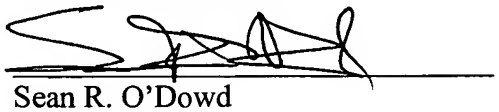
By: 

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